Space Weather Forecast

Issued on Tuesday, 14 May 2024 at 13:22 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: A reducing risk of Minor-Moderate Geomagnetic storms days 1 and 2 (14-15 May). Chance of Strong flares continues, decreasing from Day 3 (16 May).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been High with a strong flare at 14/0209UTC from the large and complex sunspot near the southwest limb. There are thirteen sunspot regions on the disc, with the sunspot region near the southwest limb the most notable. This remains a large and complex sunspot, however due to its position close to the west limb, this is now becoming impossible to accurately analyse. Given the history, size and complexity of the sunspot, this is expected to dominate the solar activity on the disc even as it rotates over the limb, with all other regions smaller and generally simpler.

No Earth-directed CMEs have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds started the period at strong levels, around 650km/s, with a steady decline to the current Elevated levels, near 550km/s. The magnetic field persisted at Weak levels, with the all-important north-south component, mostly positive (northward), but became negative from around 14/1000UTC. The resulting geomagnetic activity was Quiet to Unsettled (Kp1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) are currently above the S1 Minor Radiation storm level, following the recent strong-class flare from the large sunspot near the southwest limb.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is expected to remain High to Moderate day 1(14 May), with further Moderate flares expected, and a likelihood of isolated strong flares. Probabilities decreasing from Day 3 (16 May) as the active region responsible for producing the recent flares continues to rotate past the western limb.

Solar Wind / Geomagnetic Activity: There are no further CME's (Coronal Mass Ejections) currently expected to arrive at Earth during the period, however due to the number of CMEs that have been released from AR3664, glancing influences from CMEs passing ahead of Earth cannot be ruled out on days 1 and 2 (14-15 May). Otherwise, ongoing CME enhanced solar winds, along with any slight influence from a Coronal hole to the northwest of the disc, is expected to gradually ease.

Activity is expected to be largely quiet to unsettled (Kp1-3), but due to the strength of the solar wind, coupled with any passing CME influence, there is an ongoing chance of Active-minor storm intervals (Kp4-Kp5), with only a slight chance of a Moderate storm (G2/Kp6). However, this risk generally declines through the period with mainly Quiet to Unsettled conditions expected by Days 3 and 4 (16-17 May).

Energetic Particles / Solar Radiation: The count rate of energetic particles is likely to continue

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above the S1 Minor Radiation storm threshold on Day 1 (14 May), before declining. Further increases are also possible given the occurrence of any significant flares from the large and complex sunspot region as it continues to rotate beyond the west limb.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	20	10	5
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	90	80	40	20
Very Active	R3 to R5 X	Yes	70	60	20	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	100	70	30	10
Very Active	≥ S3 *	No	10	10	10	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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